









Boeing and RFID

DoD RFID for Industry Summit – 9 Feb 2005

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How Did We Get Where we Are?

Moore's Law: computing power doubles every 18 months

Gilder's Law: Network bandwidth capacity doubles every 12 months

Metcalfe's Law: Value of network increases exponentially as number of participants increases

Asking Ourselves; has the "Internet of things" transitioned from the 'ethereal plane'?

Where We Started

Application	Research and Development	Engineering Impact	Supplier Impact	Investment Costs	Pot. benefit (savings & quality)	Implement Timeframe
Non-Calibrated Tools						
Perishable Material						
Hazardous Material						
Calibrated Tools						
Work in Process						
Support / Handling Equipment						
Supply Chain						

Less Science and Quantitative Analysis, More Intuition and Intrinsic Opportunity

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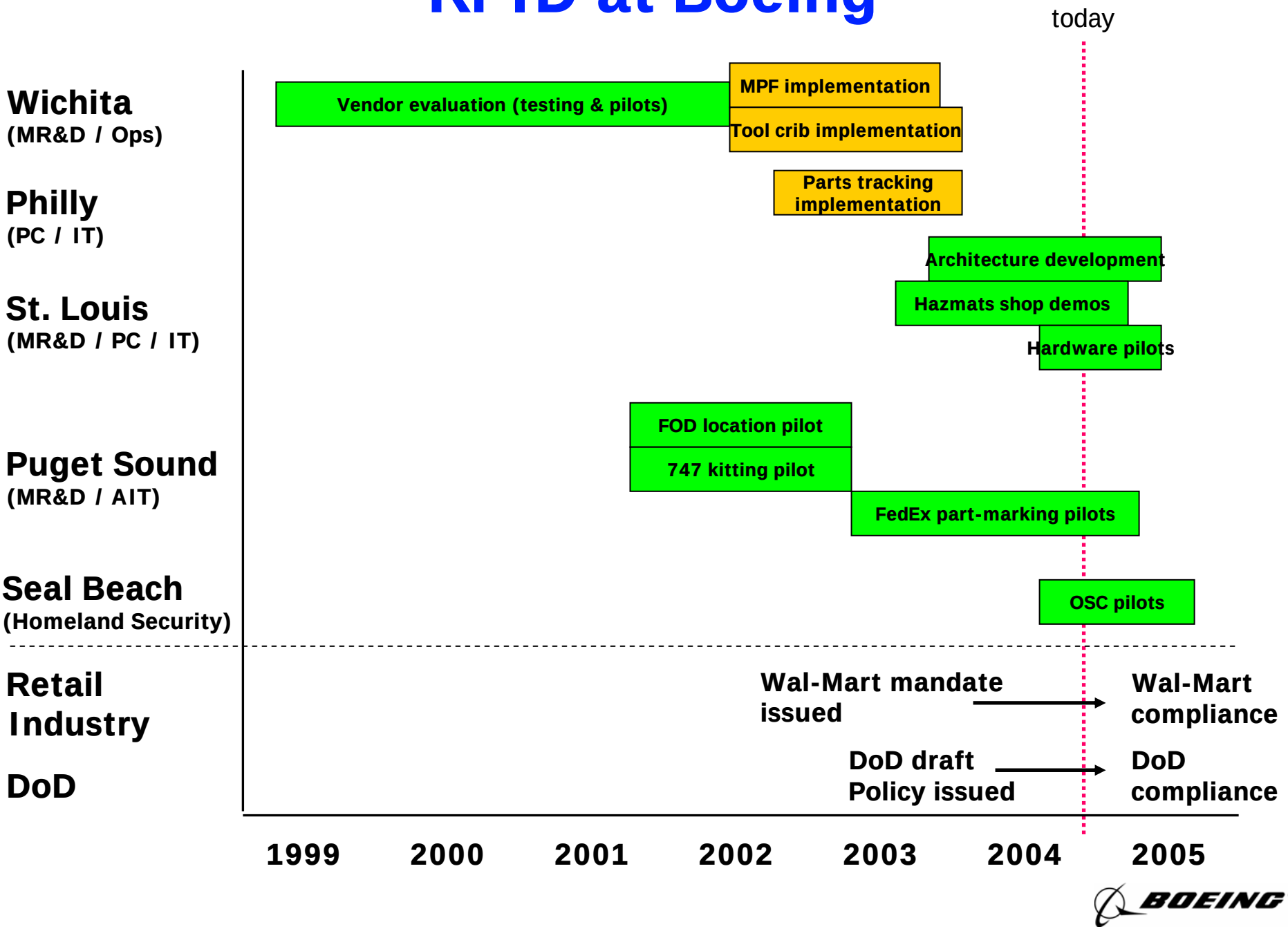
RFID at Boeing



Don’t Mire in the Business Case

Mandates trump business cases

RFID ROI is beyond any budgetary horizon

However…

- Spending without cost controls is foolishness
- RFID can be a money pit
- Intuition does not placate shareholders (or bosses)
- It’s a long, long road

Solution:

- Establish spending thresholds
- Create ‘risk sharing’ relationships with technology providers
- Develop ‘gate reviews’ and stringent success criteria for projects
- Get Started!!!!!

Getting the Perspective of a Supplier

Majority (sometimes all) of hardware installed in Boeing products come from external sources

An army of ‘RFID Solution Providers’ are knocking at our suppliers door

An army of customers are legislating requirements

Infrastructure for your suppliers will cost you more than your internal operations

It’s barcodes all over again...

A pilot program with your suppliers is one of the greatest learning opportunities!

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Time and Temperature Sensitive Material

Description

- Labels on all containers of time-and-temperature sensitive materials
- Readers at storage locations
- Implement a warning system to detect near-expired material
- Employ an automated material tracking and replenishment system

Benefits

- Eliminate expired material in production
  - Eliminate labor required to audit inventory
  - Eliminate external audit findings of expired materials
- Maintain right-size inventory levels
  - Reduce material procurement and disposal costs
  - Automated re-ordering signal to suppliers
- Facilitate environmental reporting
- Warn of improper material storage or co-location

Parts Receiving

Description

- Place (RFID) labels on re-usable part containers and place readers at receiving dock doors
- Associate tags with parts at supplier
- Automate parts receiving transactions and serialized parts database entries

- ## Benefits
- Eliminate receiving transaction labor
- Eliminate serialized part database entry labor
- Improve accuracy of parts receipt

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Making it Work

Outbound Shipping

Description

- Joint project being worked with customer and technology providers
- Labels on all shipments
- Readers at Boeing docks and planned for customer delivery points
- Automate tailkits shipping & receiving identification & transactions

Benefits

- Eliminate shipping and receiving transaction labor
- Improve accuracy of shipments
- Work with DoD on RFID requirements
- Work with DoD on supplier systems interfaces

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Getting to Know Our Customers Better

Those defining the requirements won't always be living with the solution

Customer benefits are driven more by business process change than the technology itself

RFID will not solve process discipline failures

- Don't allow unreasonable expectations

Know the environment where RFID is intended to be leveraged – maintenance, depot, port, battlefield

Don't over-commit, integrity has a high price!

What We've Learned: Internal Challenges

A technology with no place to call home

Control the hype before it controls you

Privacy is always an issue, you'd be surprised what people think

Airplane factories have a lot of:

- Metal
- RF Noise
- Open spaces
- Radio absorbing material

The door that 'nobody uses' is used quite often

The real magic is changing business processes

What About Barcodes?

Barcodes (and human readable print) have a long life ahead

Physics & Environment – Long road for RFID

Open Spaces – Some areas too open for practical application of RFID

Mature applications – Never an ROI

Control of Reads – Sometimes need refined read control

Redundant Backup – RFID system/tag failures

Human readable information – FF 1111 1111V99063 7027W123XAX doesn’t mean much to the guy on the dock

What We've Learned: Technology Provider Challenges

Right now I don't care about 5 cent tags, I just want them when I need them!

Who knows how to fix this stuff (within the next hour)?

Be patient, the new stuff will be compliant with Gen II

Upgrades (need I say more?)

We understand your urgency, but we're under the gun with:
Wal-Mart, no DoD, wait, where are you from again?

The market is changing rapidly, be careful if you get seasick because this boat is really rocking!

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What We've Learned: Customer Challenges

Facing the same technology challenges as us, but with no money!

Policy makers can't go it alone, services need to be influenced

The big guys need to check the ice first and find the weak spots

Don't forget about UID...

Last I checked, there is still a war going on

RFID Considerations

➢**BUSINESS CASE**	ROI / COMPLIANCE
➢ **PROCESS IMPROVEMENTS**	WHERE MONEY IS MADE
➢ **FREQUENCY MGT**	MORE FREQUENCIES, MORE CHALLENGES
➢**NETWORK**	WIRELESS & WIRED
➢**SECURITY**	DATA
➢**COMMON DATA MODEL**	ACCURATE DATA, QUICKLY
➢**STANDARDS/PROCEDURES**	REDUCE COSTS/DEFECTS

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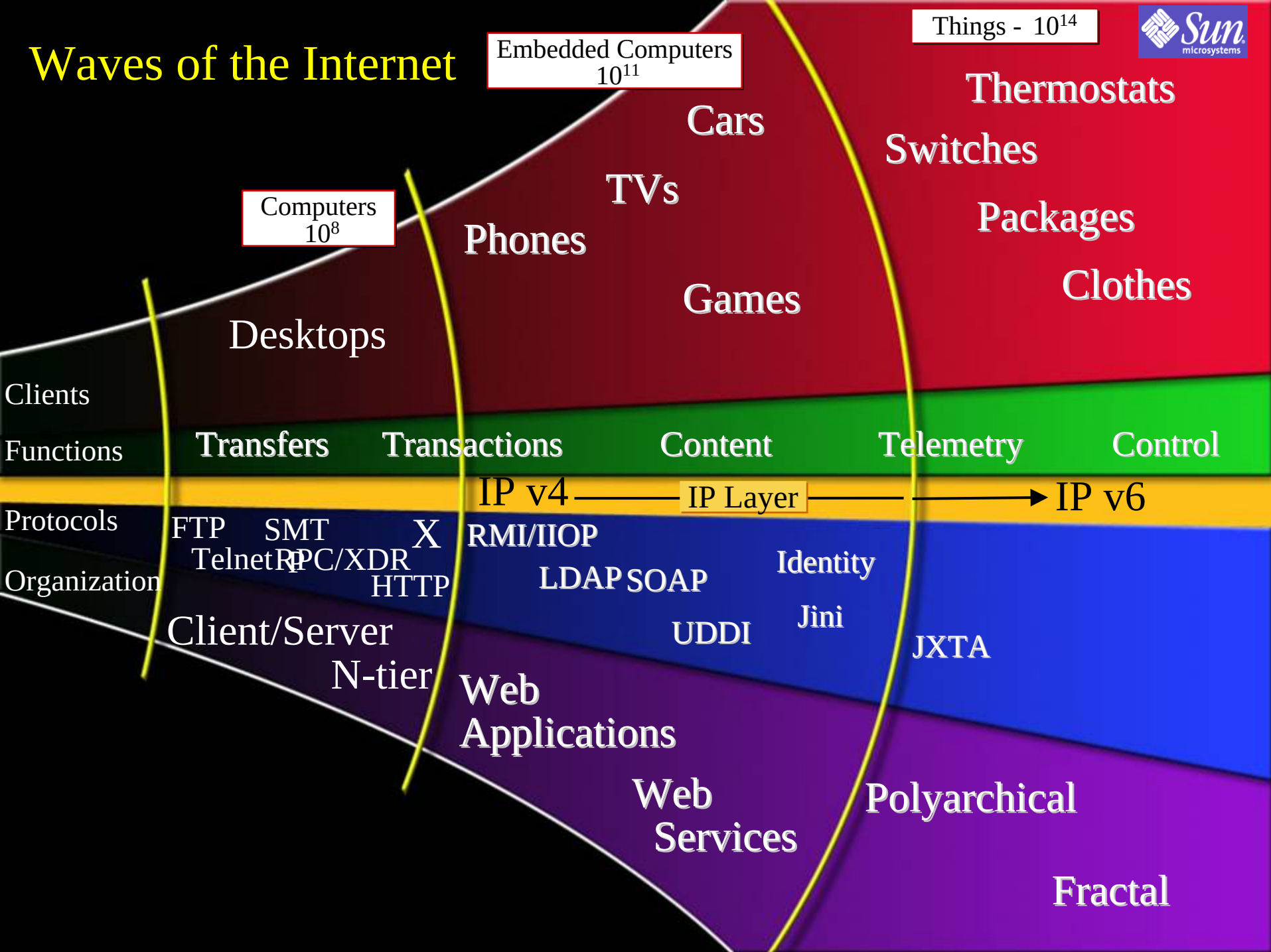
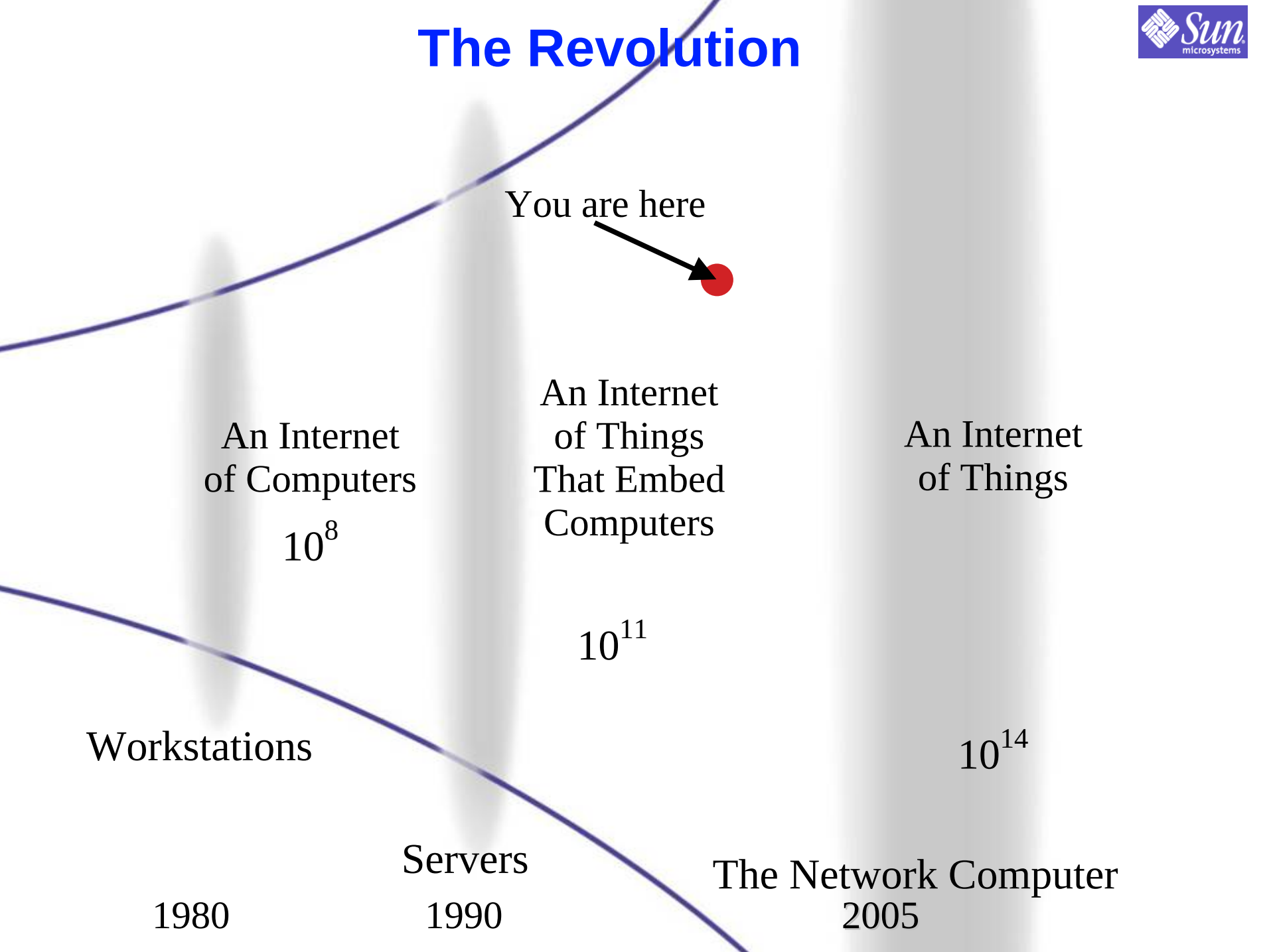

Waves of the Internet
Embedded Computers
10^11
Things - 10^14
Sun microsystems
Thermostats
Cars
Switches
TVs
Computers
10^8
Packages
Phones
Clothes
Games
Desktops
Clients
Functions
Transfers
Transactions
Content
Telemetry
Control
IP v4
IP Layer
IP v6
Protocols
FTP
SMT
X
RMI/IIOP
Telnet
RPC/XDR
Identity
Organization
HTTP
LDAP
SOAP
Jini
Client/Server
UDDI
JXTA
N-tier
Web
Applications
Web
Services
Polyarchical
Fractal

The Revolution



Boeing, RFID and DoD

- **This is an OPPORTUNITY, not a REQUIREMENT**
- **There is no “I” in Team**
- **Think across the Boeing enterprise to leverage our RFID experience outside of our DoD customers**
- **How Does This Fit into DoD Transformation and What About Change Management?**
- **Eating our own cooking – RFID and Network-Centric Systems and Solutions.**

Boeing is Serious about RFID -
It is a Sensor That Feeds Data into a Network-Centric System and Decision Environment (Internally and Externally)

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